**5–22** Determine o limite, se existir, ou mostre que o limite não existe.

**5.** $\lim\limits_{(x, y)\to(1, 2)} (5x^3 - x^2y^2)$

**6.** $\lim\limits_{(x, y)\to(1, -1)} e^{-xy} \cos(x + y)$

**7.** $\lim\limits_{(x, y)\to(2, 1)} \dfrac{4 - xy}{x^2 + 3y^2}$

**8.** $\lim\limits_{(x, y)\to(1, 0)} \ln\left(\dfrac{1 + y^2}{x^2 + xy}\right)$

**9.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{x^4 - {}^4y^4}{x^2 + 2y^2}$

**10.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{x^2 + \operatorname{sen}^2 y}{2x^2 + y^2}$

**11.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{xy \cos y}{3x^2 + y^2}$

**12.** $\lim\limits_{(x, y)\to(1, 0)} \dfrac{xy - y}{(x - 1)^2 + y^2}$

**13.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{xy}{\sqrt{x^2 + y^2}}$

**14.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{x^4 - y^4}{x^2 + y^2}$

**15.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{x^2 y e^y}{x^4 + 4y^2}$

**16.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{x^2 \operatorname{sen}^2 y}{x^2 + 2y^2}$

**17.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{x^2 + y^2}{\sqrt{x^2 + y^2 + 1} - 1}$

**18.** $\lim\limits_{(x, y)\to(0, 0)} \dfrac{xy^4}{x^2 + y^8}$

**19.** $\lim\limits_{(x, y, z)\to(\pi, \theta, 1)} e^{y^2} \operatorname{tg}(xz)$

**20.** $\lim\limits_{(x, y, z)\to(0, 0, 0)} \dfrac{xy + yz}{x^2 + y^2 + z^2}$

**21.** $\lim\limits_{(x, y, z)\to(0, 0, 0)} \dfrac{xy + yz^2 + xz^2}{x^2 + y^2 + z^4}$

**22.** $\lim\limits_{(x, y, z)\to(0, 0, 0)} \dfrac{yz}{x^2 + 4y^2 + 9z^2}$

**29–38** Determine o maior conjunto no qual a função é contínua.

**29.** $F(x, y) = \dfrac{xy}{1 + e^{x-y}}$

**30.** $F(x, y) = \cos\sqrt{1 + x - y}$

**31.** $F(x, y) = \dfrac{1 + x^2 + y^2}{1 - x^2 - y^2}$

**32.** $H(x, y) = \dfrac{e^x + e^y}{e^{xy} - 1}$

**37.** $f(x, y) = \begin{cases} \dfrac{x^2 y^3}{2x^2 + y^2} & \text{se } (x, y) \neq (0, 0) \\ 1 & \text{se } (x, y) = (0, 0) \end{cases}$

**38.** $f(x, y) = \begin{cases} \dfrac{xy}{x^2 + xy + y^2} & \text{se } (x, y) \neq (0, 0) \\ 0 & \text{se } (x, y) = (0, 0) \end{cases}$